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(54) Title: MESSAGE CHARGING COUNTERS FOR SUBSCRIBER GROUPS
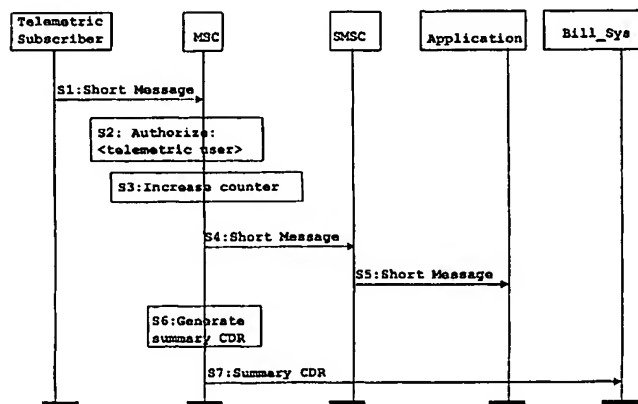
(57) Abstract: The present invention proposes a method for generating charging data for at least one specific user group (A, B) comprising at least one user terminal (A1, A2, A3), said at least one user group having subscribed to a communication network (MSC, SMSC, BILL SYS) said communication network comprising at least one exchange entity (MSC, SMSC) adapted to forward messages transmitted from a respective user terminal (A1, A2, A3) of said at least one specific user group (A) to a respective predetermined destination (D_A) associated to a respective one of said at least one specific user group (A), wherein at said exchange entity (MSC, SMSC) there is allocated a respective counter means (C_A, C_B, C_C) to each of said predetermined destinations (D A, D B, D C), said method comprising the steps of: detecting (S2) the arrival of a message at said exchange entity (MSC, SMSC), verifying (S2) that the origin of said message is a user terminal (A1, A2, A3) belonging to one (A) of said at least one specific user groups (A, B), identifying (S2) said at least one specific user group (A) and said associated predetermined destination (D A), and incrementing (S3) said counter means (C_A, C_B, C_C) allocated to said predetermined destination (D_A, D_B, D_C) associated to said identified specific user group(A, B). Also, the present invention proposes an accordingly adapted exchange entity of a communication network.

TITLE OF THE INVENTION

MESSAGE CHARGING COUNTERS FOR SUBSCRIBER GROUPS

5   FIELD OF THE INVENTION

The present invention relates to a method for generating
charging data for at least one specific user group
comprising at least one user terminal, said at least one
10 specific user group having subscribed to a communication
network, said communication network comprising at least one
exchange entity. Also, the present invention relates to a
correspondingly adapted exchange entity of said
communication network.

15

BACKGROUND OF THE INVENTION

In communication networks, such as for example a GSM
network, a plurality of subscribers have subscribed
20 thereto. Among the plurality of subscribers, several
subscriber groups comprising subscribers with an identical
or at least rather similar subscriber profile can be
defined. A subscriber profile in this connection means the
behavior of an individual subscriber belonging to said
25 group, with the subscribers belonging to a subscriber group
behaving in an identical or rather similar way.

The present application and the invention as described
below is applicable to all specific subscriber groups which
30 can be recognized, irrespective of the parameter used for
recognizing the subscriber group.

For example, a subscriber group may be represented by the
salesmen of a company traveling/roaming within the network
35 and regularly calling their company headquarter. Still

further, a subscriber group may be represented by
telemetric subscribers / telemetric users.

Only for explanatory purposes, the telemetric subscribers
5   are chosen hereinafter. Nevertheless, the present invention
is not limited to those telemetric subscribers. In this
connection, a telemetric subscriber is intended to mean a
user terminal such as a mobile station MS or just a
wireless (non-mobile) terminal which is related to an
10 appliance such as a gas meter or electricity meter or a
water meter. The terminal sends information from the
appliance in the form of messages. The messages carry
information related to the appliance such as the amount of
gas/water/electricity consumed at the appliance. Typically,
15 such a message is a SMS message (Short Message Service) or
an USSD message (Unstructured Supplementary Service Data).
Also, there are normally a huge number of such telemetric
users since each apartment or house has such an
appliance(s) to which a telemetric subscriber can be / is
20 associated. Thus, a telemetric user means: no speech calls,
but only SMS and/or USSD traffic and/or data calls; low
traffic profile, e.g. controllable traffic scheduling (out
of busy hours); no need for continuos mobility management
(MM) handling; and limited service profiles, limited
25 service area.

A typical example can be a mobile station / wireless
terminal MS installed next to a gas- or electric- meter,
positioned on a fixed place, at a house (no MM), reporting
30 once a month (low traffic) by SMS (no calls) at night
(traffic scheduling).

The messages transmitted by said telemetric user terminals
are directed to a central database which is a predetermined
35 destination for a telemetric user. Namely, a telemetric

user reporting the electricity consumption at an appliance
will of course report this to a database of the electricity
provider / electricity company.

5   Because of the huge amount of telemetric users (there are
    hundreds of thousands of gas and electricity meters in any
    big city in the world) charging in GSM system might become
    very loaded as a CDR (call detail record) is generated when
    telemetric users send their data. If the number of
10 telemetric users increases significantly in the near future
    message (SMS) charging will become one of the capacity
    bottlenecks.

    Previously, different kinds of options for barring CDR
15 generation and to selectively generate them. The following
    options are for example available:
    1. The type of SMS for which CDRs are generated (normal,
    status report and/or command SMS) can be chosen;
    however, this results in the fact that messages of some
20 types could be sent for free which is not desirable from a
    viewpoint of a network operator who provides transmission
    capacities in the network;
    2. It can be chosen whether the CDRs are generated for all
    messages or only for successfully transmitted ones;
25 however, also messages (SMS) which are not successfully
    delivered consume transmission capacity until they are
    found to be undeliverable/not successfully delivered, and
    any usage of transmission capacity is desirable from a
    viewpoint of a network operator who provides transmission
30 capacities in the network to be charged for;
    3. It can be chosen where and how CDRs are generated (i.e.
    whether at a Visited Mobile Switching Center VMSC, at
    Interworking Mobile Switching Center IWMSC, at a Gateway
    Mobile Switching Center GMSC (also referred to as Transit
35 Mobile Switching Center); however, although this

distributes the CDRs generated within the network, the
overall number thereof remains uninfluenced thereby;

4. It can be chosen whether CDRs are generated for Mobile
Originated MO, Mobile Terminated MT and/or Mobile Forwarded
MF messages; however, any usage of transmission capacity is
desirable from a viewpoint of a network operator who
provides transmission capacities in the network to be
charged for, whereas according to such an approach, some
messages could be transmitted for free, as mentioned above;

Thus, none of the previous proposals provides for a
satisfactory charging of messages transmitted by a specific
user group while avoiding congestion situations in the
network and while saving network resources.

SUMMARY OF THE INVENTION

Consequently, it is an object of the present invention to
provide a method for generating charging data for at least
one specific user group comprising at least one user
terminal, said at least one specific user group having
subscribed to a communication network said communication
network comprising at least one exchange entity, which
method is free from above mentioned drawbacks.

Still further, it is an object of the present invention to
provide an accordingly adapted network exchange entity.

According to the present invention, the above first object
is achieved by a method for generating charging data for at
least one specific user group comprising at least one user
terminal, said at least one specific user group having
subscribed to a communication network said communication
network comprising at least one exchange entity adapted to
forward messages transmitted from a respective user

terminal of said at least one specific user group to a
respective predetermined destination associated to a
respective one of said at least one specific user group,
wherein at said exchange entity there is allocated a
5   respective counter means to each of said predetermined
destinations, said method comprising the steps of:
detecting the arrival of a message at said exchange entity,
verifying that the origin of said message is a user
terminal belonging to one of said at least one specific
10   user groups, identifying said at least one specific user
group and said associated predetermined destination, and
incrementing said counter means allocated to said
predetermined destination associated to said identified
specific user group.
15

According to further developments of the present invention
- the method comprises a further step of generating
charging data (CDR) based on a count value of said counter
means;
20   - the method comprises a further step of resetting said
respective counter means after generation of charging data;
- said charging data (CDR) is regularly generated after a
predetermined period of time;
- said charging data (CDR) is regularly generated when the
25   counter means reaches a predetermined count value;
- the method comprises a further step of delivering said
message to said associated predetermined destination;
- the method comprises a step of transmitting the generated
charging data (CDR) to a billing entity of said
30   communication network, and establishing a bill on the basis
of said charging data for said respective specific user
group;
- said specific user group is a telemetric user group;
- said message is a short message SMS;
35   - said message is a USSD message;

According to the present invention, the above second object
is achieved by an exchange entity of a communication
network adapted to forward messages transmitted from a
5   respective user terminal of at least one specific user
group to a respective predetermined destination associated
to a respective one of said at least one specific user
group, said exchange entity comprising: a respective ·
counter means associated to each of said predetermined
10   destinations, detecting means adapted to detect the arrival
of a message at said exchange entity, verifying means
adapted to verify that the origin of said message is a user
terminal belonging to one of said at least one specific
user groups, identifying means adapted to identify said at
15   least one specific user group and said associated
predetermined destination, and control means adapted to
increment said counter means allocated to said
predetermined destination associated to said identified
specific user group in response to signals applied thereto
20   from said detecting, verifying and identifying means.

According to further developments of the present invention
- said entity further comprises generation means adapted to
generate charging data (CDR) based on a count value of said
25   counter means;
- said control means is adapted to reset said respective
counter means after generation of charging data;
- said control means is adapted to regularly generate said
charging data (CDR) after a predetermined period of time.
30   - said control means is adapted to regularly generate said
charging data (CDR) when the counter means reaches a
predetermined count value;
- said entity further comprises an output means adapted to
deliver said message to said associated predetermined
35   destination;

- said entity further comprises a transmitter adapted to
transmit the generated charging data (CDR) to a billing
entity (BILL_SYS) of said communication network adapted to
establish a bill on the basis of said charging data for
5   said respective specific user group.

Accordingly, by virtue of the present invention, the
following advantages can be obtained:
- charging of user of a user group such as telemetric users
10   can be simplified,
- generation of hundreds of thousands or millions of CDRs
per month can be prevented
- charging capacity in an exchange entity such as an MSC as
well as in a billing system can be saved,
15   - congestion in the communication system in connection with
transmitting of CDRs can be avoided,
- network resources can be saved and/or saved resources can
be used for other purposes than CDR transmission,
- a more efficient usage of the communication network
20   resources is thus enabled by provisioning these advanced
telemetric and message services for the communication
network's customers, while the companies owning the
telemetric user system may lower their operating costs as
there is no more need for personnel to collect the data,
25   which by the way are more accurate and obtained more
quickly when using a telemetric system.

BRIEF DESCRIPTION OF THE DRAWINGS

30   The above and other objects, features and advantages of the
present invention will become more fully apparent when read
in conjunction with the accompanying drawings, in which

Fig. 1 illustrates a signaling scenario and method steps executed in connection with the method according to the present invention, and

5   Fig. 2 illustrates a block diagram of those components of an exchange entity of a communication network which are relevant in connection with the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

10

The present invention will now be described in detail with reference to the drawings.

Fig. 1 illustrates a signaling scenario and method steps
15   executed in connection with the method according to the present invention.

A telemetric subscriber, i.e. a terminal thereof such as a mobile station, is assumed to represent a subscriber
20   belonging to a specified user group. Although in Fig. 1 only one telemetric subscriber is shown, a plurality of those telemetric subscribers of one or more subscriber groups may be present. In order to keep the description simple, however, only one telemetric subscriber is
25   considered for explanatory purposes. Nevertheless, the present invention may also cope with the case of plural subscribers of plural subscriber groups.

The subscriber group or groups have subscribed to a
30   communication network. For explanatory purposes, the communication network is assumed to be a GSM network (Global Standard of Mobile communication) and the labeling of the network entities referred to is given with regard to the GSM network as an example. Nevertheless, it is to be
35   noted that the present invention is also applicable and to

- 9 -

be implemented to another communication network such as the
UMTS (Universal Mobile Telecommunications System) network
etc.

5   Also, only those network parts involved in the present
invention are shown and explained. Thus, the access network
such as a radio access network RAN of GSM and/or UTRAN
(Universal Terrestrial Radio Access Network) of UMTS are
neither shown nor explained.

10

Now, referring back to Fig. 1, in step S1 a telemetric
subscriber terminal sends a message to the communication
network. More particularly, the terminal sends a Short
Message also known as SMS via the (radio) access network

15   (not shown) to the exchange entity of the network.
According to GSM standards, the exchange entity is a Mobile
Switching Center MSC. Still further, in case the sent
message is an SMS, the exchange entity can be regarded as a
cooperation of an MSC and an SMSC (Short Message Service

20   Center).

The message consists of a message header carrying sender
identification information as well as destination
identification information such as respective addresses or

25   telephone numbers, and a message body carrying the content
/use data of the message. In case of a telemetric user
terminal installed at a gas meter, the message content
includes the amount of consumed gas. These data are to be
forwarded to an "application" (also referred to as

30   "destination" in Fig. 2), i.e. the company who provides the
gas and bills the consumer for the amount of gas delivered.
To be distinguished from this billing for gas consumption
is the billing of the company by the operator of the
network for the usage of communication network resources

for forwarding the messages to the "application", i.e. the
gas providing company.

In step S2, the exchange entity MSC detects the arrival of
5   said message (SMS or USSD, for example) at the exchange
entity. Also, the MSC performs a verification that the
origin of said message is a user terminal belonging to one
of said at least one specific user groups, as well as an
identification of said at least one specific user group and
10 said associated predetermined destination.

If the verification and identification was successful, the
exchange entity MSC increments, step S3, a counter means
allocated to said predetermined destination associated to
15 said identified specific user group to which said
subscriber belongs.

The message is then, in step S4, forwarded to an SMSC co-
operating with said MSC for further delivering the message
20 in a subsequent step S5 to the application, i.e. the
intended destination of the message. At the application
side, the message contents (contained in the message body)
is processed further (not shown).

25 At the exchange entity side, in step S6, charging data
(CDR) based on a count value of said counter means are
generated. Of course, it is to be understood that there is
a resetting of said respective counter means after
generation of charging data, and also a resetting upon
30 counter initialization (not shown) in the beginning of a
charging cycle. With regard to a charging cycle, said
charging data (CDR) can be regularly generated after a
predetermined period of time. Nevertheless, it is also
possible that said charging data (CDR) is regularly
35 generated when the counter means reaches a predetermined

- 11 -

count value (in this case, a cycle would not depend on a
lapsed period time but on a predefined billing amount).

5   The generated charging data (CDR) are in step S7
transmitted to a billing entity BILL_SYS of said
communication network, which billing entity establishes a
bill on the basis of said charging data for said respective
specific user group. The established bill then charges the
owner of the telemetric user group for the usage of the
10   communication network, with the billing being based on the
number of transmitted messages.

Thus, as explained above, in order to avoid congestion
situations and to save communication network resources, a
15   special counter system is introduced. The system is located
in an exchange entity such as the MSC. Counters of the
system record the number of mobile originated short
messages (MO-SM) from different telemetric users owned by
organizations, for example during one months, and generate
20   only one CDR per organization (several if one organization
owns many telemetric user systems like gas and
electricity). By doing so the system would be prevented
from generating hundreds of thousands or even millions of
CDRs per month. This would save capacity in both the MSC
25   (mobile switching center) and Billing System. In detail, a
telemetric users send an SMS message to an application
(destination) which records the data in the message to a
database. The message arrives in an MSC where the called
number (B-number) of the destination is analyzed. Analysis
30   includes user category recognition. If the category is
"telemetric user" then the counter assigned to the
destination / B-number will be increased and or
incremented. If the category is not "telemetric user"
(fraud situation) the mobile originated short message MO-SM
35   will not be delivered and the counter will be left

- 12 -

untouched. The SMS continues from the MSC to the
application through an SMSC (SMS Center). After a certain
time has passed (for example 1 month) a summary CDR is
generated per counter in MSC and sent to the billing system
5   attached to the MSC. Thereby, the network operator will
charge the organization owning the telemetric equipment by
transactions made during the set period, with the price
being defined by a transaction.

10   Fig. 2 illustrates a block diagram of those components of
an exchange entity of a communication network which are
relevant in connection with the present invention.

As shown in Fig. 2, different specified user groups A, B, C
15   are present. Each user group comprises a plurality of
individual users /user terminals, such as A1, A2, A3 in
connection with user group A. A message such as a SMS from
a respective user to a predetermined destination for the
user group to which said user belongs to is sent via the
20   communication network to a destination D_A (for user group
A) or D_B, D_C in case of user groups B, C, respectively.

As shown in Fig. 2, the exchange entity is for example an
MSC of the network. This exchange entity comprises a
25   detection means, a verification/identification means, and
an output means. The message from a subscriber (e.g. A1) is
received at said exchange entity MSC. The message is
decomposed into message header and message body. For
example, based on the message header, it is detected that a
30   message SMS has been received. Then, the detection result
controls the identification/verification means to
verify/identify the origin and destination of the message
based on the information included in the header.

- 13 -

The operation of these means is as described above in
connection with the authentication in step S2 of Fig. 1.
Namely, if the message originating user belongs to a
specified subscriber group, the verification/identification
5 means controls the output means to deliver the message to
the destination defined by data contained in the message
header (e.g. to destination for subscriber group A, i.e.
D_A), as described in connection with steps S1, S4, S5 in
Fig. 1.
10

Furthermore, the exchange entity comprises a control and
timer means, a counter means comprising a counter C_A, C_B,
C_C for each user group A, B, C, respectively, a CDR
generation means for generating charging data, and a
15 transmitter means for transmitting generated charging data
to a billing system entity BILL_SYS of the communication
network.

If the verification/identification was successful in that
20 the message originating subscriber terminal (e.g. A1)
belongs to a specified user group, the control and timer
means is triggered accordingly. The control and timer means
then outputs a count signal and increments the counter
(e.g. C_A) associated to the user group to which the
25 message originating subscriber terminal belongs. Thus, upon
reception of each respective message from a user of a
specified user group the corresponding counter of said
counter means is incremented.

30 Still further, the control and timer means controls the CDR
generation means in order to generate charging data based
on the counter value(s) and to output these data to said
transmitter means for transmission to the billing system
entity of the communication network BILL_SYS. (Note that

- 14 -

control signals applied from the control means to the
transmitter means are omitted in the drawing).

The operation of these means is as described above in
5   connection with steps S3, S6, S7 of Fig. 1.

Although herein above the present invention has been
described such that the method steps and corresponding
means are implemented at the MSC as an exchange entity, it
10   is to be understood that the method steps and means could
also be implemented at the SMSC as an exchange entity of
the network.

Still further, the present invention has been described
15   such that based on the count value(s) of the counter(s)
charging data (CDRs) are generated and that the CDRs are
transmitted to the billing system entity. Nevertheless, it
is of course possible to transmit the counter value(s) as
such and to provide for the generation of the CDRs at the
20   billing system side.

Moreover, from a security aspect, it is of course to be
understood that the counter value(s) are backed-up at the
MSC and/or SMSC or somewhere else in the network,
25   preferably in a non-volatile memory, as the counter values
may represent a significant amount of money to be charged
by the network operator running the communication network.

Also, in order to identify users belonging to a specific
30   user group, a corresponding information has to be provided
in a database, e.g. in the Home Location Register HLR of
the network. Alternatively, such a database may be provided
directly in the exchange. Or, a copy of a database in the
HLR may be downloaded to an exchange entity.

35

It has to be noted that although the above description has
mainly be given with regard to mobile originated messages
(MO-SM), the present invention is easily applicable to
mobile terminated messages. For example, assuming a case in
5   which an application (Fig. 2) addresses individual users by
a message sent to them. I such a case, the sent message
(header thereof) could be analyzed and the number of
destination addresses corresponding to a number of
addressed user terminals could be counted. Thus, each time
10   such a message is sent, the counter for the user group is
not incremented by one but augmented by the number of
addressed user terminals.

Accordingly, as has been described in the foregoing, the
15   present invention proposes a method for generating charging
data for at least one specific user group (A, B) comprising
at least one user terminal (A1, A2, A3), said at least one
specific user group having subscribed to a communication
network (MSC, SMSC, BILL_SYS) said communication network
20   comprising at least one exchange entity (MSC, SMSC) adapted
to forward messages transmitted from a respective user
terminal (A1, A2, A3) of said at least one specific user
group (A) to a respective predetermined destination (D_A)
associated to a respective one of said at least one
25   specific user group (A), wherein at said exchange entity
(MSC, SMSC) there is allocated a respective counter means
(C_A, C_B, C_C) to each of said predetermined destinations
(D_A, D_B, D_C), said method comprising the steps of:
detecting (S2) the arrival of a message at said exchange
30   entity (MSC, SMSC), verifying (S2) that the origin of said
message is a user terminal (A1, A2, A3) belonging to one
(A) of said at least one specific user groups (A, B),
identifying (S2) said at least one specific user group (A)
and said associated predetermined destination (D_A), and
35   incrementing (S3) said counter means (C_A, C_B, C_C)

allocated to said predetermined destination (D_A, D_B, D_C) associated to said identified specific user group(A, B). Also, the present invention proposes an accordingly adapted exchange entity of a communication network.

5

Although the present invention has been described herein above with reference to its preferred embodiments, it should be understood that numerous modifications may be made thereto without departing from the spirit and scope of

10 the invention. It is intended that all such modifications fall within the scope of the appended claims.

- 17 -

CLAIMS

1. A method for generating charging data

for at least one specific user group (a, B) comprising

at least one user terminal (A1, A2, A3),

said at least one specific user group having

subscribed to a communication network (MSC, SMSC,

BILL_SYS)

said communication network comprising

at least one exchange entity (MSC,

SMSC)

adapted to forward messages

transmitted from a respective user

terminal (A1, A2, A3) of said at least

one specific user group (A) to a

respective predetermined destination

(D_A) associated to a respective one of

said at least one specific user group

(A), wherein

at said exchange entity (MSC,

SMSC) there is allocated a respective

counter means (C_A, C_B, C_C) to each

of said predetermined destinations

(D_A, D_B, D_C),

said method comprising the steps of:

- detecting (S2) the arrival of a message at said

exchange entity (MSC, SMSC),

- verifying (S2) that the origin of said message is a

user terminal (A1, A2, A3) belonging to one (A) of said at

least one specific user groups (A, B),

- identifying (S2) said at least one specific user

group (A) and said associated predetermined destination

(D_A), and

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- 18 -

- incrementing (S3) said counter means (C_A, C_B, C_C)
allocated to said predetermined destination (D_A, D_B, D_C)
associated to said identified specific user group(A, B).

5   2. A method according to claim 1, further comprising a step
of
     - generating (S6) charging data (CDR) based on a count
value of said counter means.

10   3. A method according to claim 2, further comprising a step
of
     - resetting said respective counter means after
generation of charging data.

15   4. A method according to claim 2, wherein
     said charging data (CDR) is regularly generated after
a predetermined period of time.

     5. A method according to claim 2, wherein
20   said charging data (CDR) is regularly generated when
the counter means reaches a predetermined count value.

     6. A method according to claim 1, further comprising a step
of
25   - delivering (S1, S4, S5) said message to said
associated predetermined destination.

     7. A method according to any of claims 2 to 5, further
comprising a step of
30   - transmitting (S7) the generated charging data (CDR)
to a billing entity (BILL_SYS) of said communication
network, and
     - establishing a bill on the basis of said charging
data for said respective specific user group.

35

8. A method according to claim 1, wherein
    said specific user group (a, B) is a telemetric user
group.

5   9. A method according to claim 1, wherein
    said message is a short message SMS.

10. A method according to claim 1, wherein
    said message is a USSD message.
10

11. An exchange entity (MSC, SMSC) of a communication
network adapted to forward messages transmitted from a
respective user terminal (A1, A2, A3) of at least one
specific user group (A, B) to a respective predetermined
15 destination (D_A, D_B, D_C) associated to a respective one
of said at least one specific user group (A, B),
said exchange entity comprising:
    a respective counter means (C_A, C_B, C_C) associated
to each of said predetermined destinations (D_A, D_B, D_C),
20   detecting means adapted to detect the arrival of a
message at said exchange entity (MSC, SMSC),
    verifying means adapted to verify that the origin of
said message is a user terminal (MS) belonging to one of
said at least one specific user groups,
25   identifying means adapted to identify said at least
one specific user group and said associated predetermined
destination, and
    control means adapted to increment said counter means
allocated to said predetermined destination associated to
30 said identified specific user group in response to signals
applied thereto from said detecting, verifying and
identifying means.

12. An exchange entity according to claim 11, further
35 comprising

- 20 -

- generation means adapted to generate charging data
(CDR) based on a count value of said counter means.

13. An exchange entity according to claim 12, wherein
        said control means is adapted to reset said respective
counter means after generation of charging data.

14. An exchange entity according to claim 12, wherein
        said control means is adapted to regularly generate
said charging data (CDR) after a predetermined period of
time.

15. An exchange entity according to claim 12, wherein
        said control means is adapted to regularly generate
said charging data (CDR) when the counter means reaches a
predetermined count value.

16. An exchange entity according to claim 11, further
comprising
        an output means adapted to deliver said message to
said associated predetermined destination.

17. An exchange entity according to any of claims 12 to 15,
further comprising
        a transmitter adapted to transmit the generated
charging data (CDR) to a billing entity (BILL_SYS) of said
communication network adapted to establish a bill on the
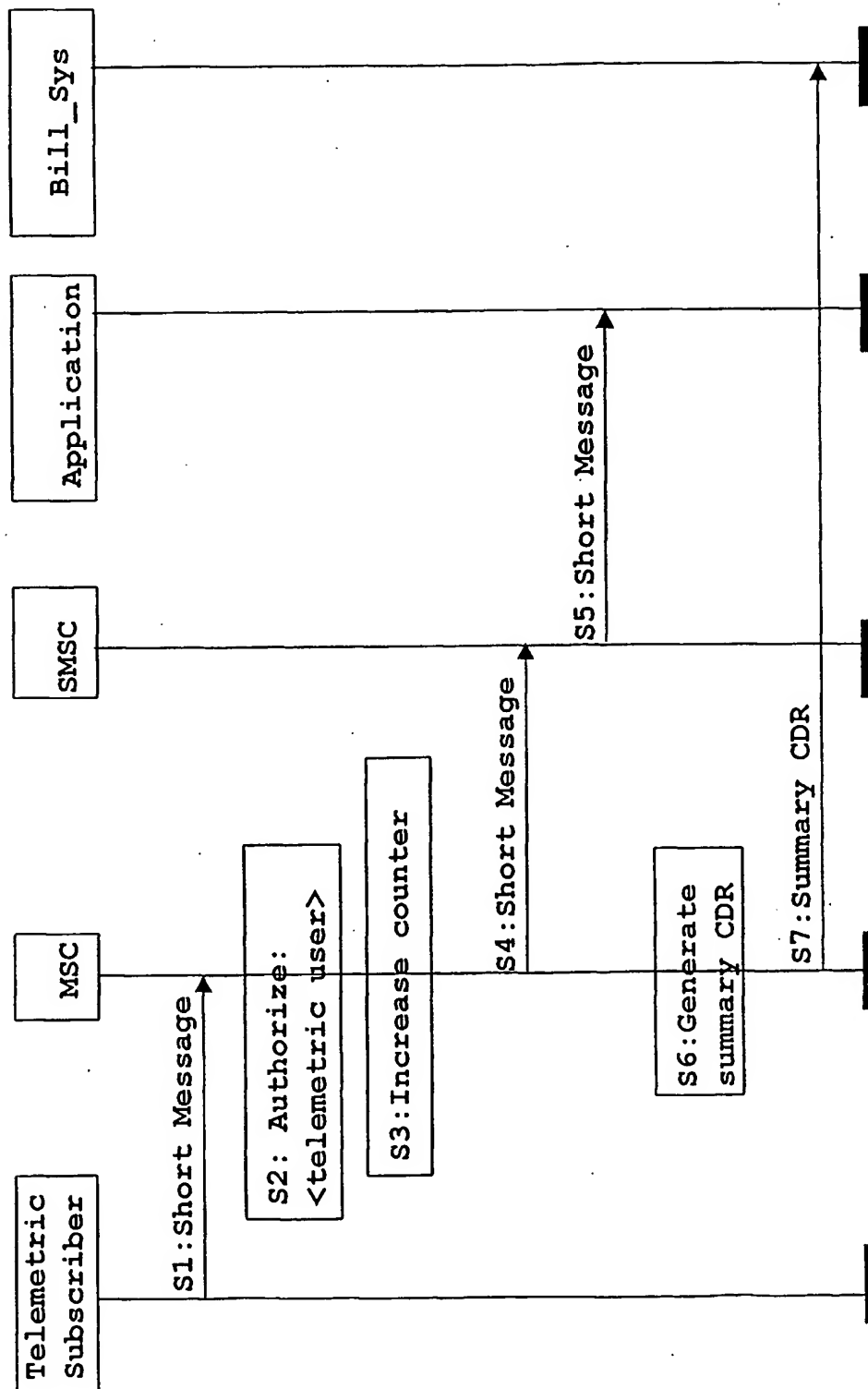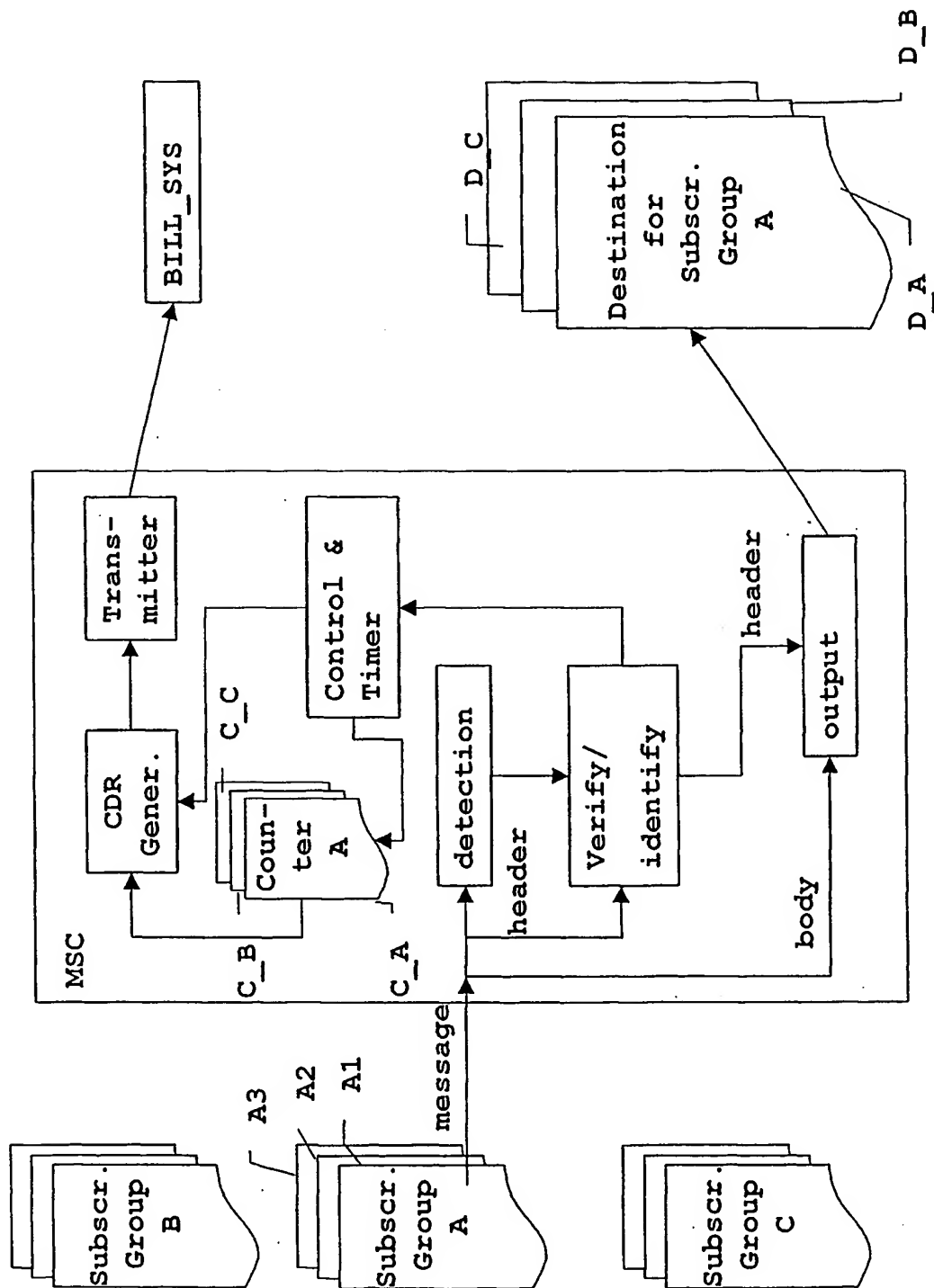basis of said charging data for said respective specific
user group.

1/2

FIG. 1

FIG. 2